**CLAIMS:**

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent is:

1. A method for initializing filter coefficients for a hybrid feedback equalizer device for reducing interference of signals transmitted over a communications channel, said hybrid feedback equalizer device implementing frequency domain (FD) filter equalization in a forward path and a time domain (TD) filter equalization in a feedback path, each FD (forward path) and TD (feedback path) filter units having a plurality of adaptable filter taps, said method comprising:

a) generating an estimated frequency response transfer function (H) of said channel;

b) performing an inverse Fast Fourier Transform (IFFT) on said channel transfer function H to result in a time domain profile of said channel;

c) limiting energy of each occurrence of post-echoes present in said channel to a predetermined value and generating a post-echo profile from said time domain profile;

d) obtaining a frequency domain representation (A) of the post-echo profile, and dividing said frequency-domain information A by said channel estimate H to obtain A/H;

e) performing an IFFT of A/H to obtain a time domain representation of the FD equalizer taps and eliminating presence of a predetermined number of taps of said time domain representation of the FD equalizer; and,

f) performing a FFT of the resulting time domain representation of FD equalizer to obtain frequency domain representation of FD equalizer taps (G), whereby said obtained taps are used to initialize the forward FD filter of said hybrid equalizer.

2. The method as claimed in Claim 1, further including the steps of:

g) multiplying said obtained FD equalizer taps G of step f) with the channel estimate H to generate a frequency-domain representation F of the feedback taps; and,

h) performing an IFFT on the frequency-domain representation of F to yield the time-domain feedback equalizer taps, wherein said obtained taps are used to initialize the feedback TD filter of said hybrid equalizer.

3. The method as claimed in Claim 1, wherein said step a) comprises the steps of:

generating a linear inverse frequency response estimate, G' of said channel; and ,

inverting said linear inverse channel estimate to obtain said channel estimate H.

4. The method as claimed in Claim 3, wherein said step of generating a linear inverse frequency response estimate G' comprises the steps of:

disabling said feedback TD equalizer filter; and,

utilizing a blind adaptive algorithm and implementing a Fast Fourier Transform (FFT) operation to said FD equalizer filter.

5. The method as claimed in Claim 4, wherein said FFT ranges between a 1K FFT and a 4K FFT.

6. The method as claimed in Claim 1, wherein said step c) further includes the steps of:

extracting clusters of post echo samples relating to taps of said feedback TD filter and limiting energy of said clusters;

appending zeros to said post-echo profile after cluster extraction.

7. The method as claimed in Claim 1, wherein said step e) of eliminating presence of taps of said time domain representation of the FD equalizer includes setting the last N taps to zero.

8. The method as claimed in Claim 1, wherein said post echoes are exhibited in a multipath interference signal pattern, each cluster group comprising energy calculated as the sum of the square of each echo in the group, said step of limiting the energy of said clusters including the step of: limiting a value of the sum of the square of the taps in the cluster.

9. The method as claimed in Claim 2, wherein initializing filter coefficients for said hybrid feedback equalizer device obeys the relation:

$$\frac{1+\mathrm{F}}{\mathrm{G}} = H .$$

10. A method for initializing filter coefficients for a hybrid feedback equalizer device for reducing interference of signals transmitted over a communications channel, said hybrid feedback equalizer device implementing frequency domain (FD) filter equalization in a forward path and a time domain (TD) filter equalization in a feedback path, each filter unit having a plurality of adaptable filter taps, said method comprising:

a) disabling said feedback TD equalizer filter;

b) generating an estimated frequency response transfer function (H) of said channel;

c) obtaining time domain representation of equalizer taps in said forward FD equalizer and eliminating taps corresponding to occurrence of post-echoes present in said channel estimate H;

d) generating a frequency domain representation G of equalizer taps in said forward FD equalizer filter;

e) generating a frequency-domain representation F of the equalizer taps in said feedback TD equalizer filter; and,

f) performing an inverse Fast Fourier Transform (IFFT) on the frequency-domain representation F to yield the time-domain feedback equalizer taps, wherein said obtained taps F and G are used to initialize the feedback TD filter coefficients and forward FD filter coefficients of said hybrid equalizer, respectively.

11. The method as claimed in Claim 10, wherein initializing filter coefficients for said hybrid feedback equalizer device obeys the relation:

$$\frac{1+F}{G} = H .$$

12. The method as claimed in Claim 11, wherein said step b) comprises the steps of:

generating a linear inverse frequency response estimate, G' of said channel; and ,

inverting said linear inverse channel estimate to obtain said channel estimate H.

13. The method as claimed in Claim 10, wherein said inverse FFT (IFFT) performed on said channel transfer function H results in a time domain profile of said channel, said step d) of generating a frequency domain representation G of equalizer taps in said forward FD equalizer filter further comprising the steps of:

limiting energy of each occurrence of post-echoes present in said channel to a predetermined value and generating a post-echo profile from said time domain profile;

obtaining a frequency domain representation (A) of the post-echo profile, and

dividing said frequency-domain information A by said channel estimate H to obtain A/H;

performing an IFFT of A/H to obtain a time domain representation of the FD equalizer taps, and eliminating presence of a predetermined number of taps of said time domain representation of the FD equalizer; and,

performing a FFT of the resulting time domain representation of FD equalizer to obtain said frequency domain representation of FD equalizer taps G.

14. The method as claimed in Claim 10, wherein said step e) of generating a frequency-domain representation F of the equalizer taps in said feedback TD equalizer filter further comprises the step of multiplying said obtained FD equalizer taps G with the channel estimate H to generate a frequency-domain representation F of the feedback taps.